Sheet os

1 **.** SIMD represents an OS that _____.
(A) refers to a computer system capable of processing several programs at the same
time.
(B) represents OS of single computer containing a control unit, processor unit and a memory unit.
√**(C)** includes many processing units under the supervision of a single instruction control
(D) none of the above.

2. simple OS is
√ **(A)** SISD **(B)** SIMD
(C) MIMD **(D)** MISD

3. A pipeline OS can be implemented by means of
(A) LIFO buffer **(B)** FIFO buffer√
(C) Stack **(D)** None of the above

4. which OS class is more powerful and expensive :
(i) Single Instruction Stream, Single Data Stream (SISD).
(ii) Single Instruction Stream, Multiple Data Stream (SIMD).
(iii) Multiple Instruction Stream, Single Data Stream (MISD).
(iv) **Multiple Instruction Stream, Multiple Data Stream (MIMD)**. √

5. in SISD

a) Instructions are executed sequentially by single processor√

b) It has a common control unit, processor operate on different data.
c) several instructions manipulate the same data
d) multiprocessing operate on multiprogramming.

6**-.** what are privileges of using symbol table
Assign the logical location of a variable in memory, this allows direct access to memory to get the value of variable.

8- **regarding process management, A program is run on a 40 MHz processor. The executed program consists of 100,000 instruction executions, with the following instruction, Determine the effective CPI (cycles per instruction), MIPS (million instructions per sec) rate, and execution time for this program**.

Instruction Type	Instruction Count	Cycles per Instruction
Integer arithmetic	45000	1
Data transfer	32000	2
Floating point	15000	2
Control transfer	8000	2

Effective CPI = (45000*1 +32000*2+15000*2+8000*2)/100000 = 1.55
Cycle time= 1/40M= 0.025 micro sec
Rate of IPS= (40M cycle/s) / (1.55 C/I) = 25.8 M I/s
Time per instruction =1/ Rate of IPS= 0.03875 micro-sec
Execution time of program = number of instructions * time per instruction
= 100000* 0.03875 = 3875 micro sec

9- **Consider two different computers, with two different instruction sets, both of which have a clock rate of 4200 MHz. The following measurements are recorded on the two computers running a given set of benchmark programs: Determine the effective CPI, MIPS rate, and execution time for each machine.**

Instruction Type	Instruction Count (millions)	Cycles per Instruction
Machine A		
Arithmetic and logic	8	1
Load and store	4	3
Branch	2	4
Others	4	3
Machine B		
Arithmetic and logic	10	1
Load and store	8	2
Branch	2	4
Others	4	3

Effective CPI for computer A= (8*1 +4*3+4*2+4*3)/18 = 2.2
Cycle time= 1/4200M= 0. 238 n- sec
Rate of IPS= (4200M cycle/s) / (2.2 C/I) = 1909 M I/s

Time per instruction = 1/ rate of IPS = 0.524 n-sec
Execution time of program = number of instructions * time per instruction
= 18000000* 0.524 = 0.0094 milli sec = 9.4 micro sec

Effective CPI for computer B= (10*1 +8*2+4*2+4*3) / 24 = 1.92
Cycle time= 1/4200M= 0. 238 n- sec
Rate of IPS= (4200M cycle/s) / (1.92 C/I) = 2191 M I/s
Time per instruction = 1/ rate of IPS = 0.456 n-sec
Execution time of program = number of instructions * time per instruction
= 24000000* 0.456 = 10.952 micro sec

10- the following 2 computers have the characteristics result: The final column shows that the first computer required 12 times longer than the measured time for the 2nd computer's CPU time. What is the relative size of the instruction count of the machine code for this program running on the two computers? What are the CPI values for the two computers?

Effective CPI for computer A=
Cycle time= 1/5M= 0. 2 micro- sec
Rate of IPS= 1 M I/s
Time per instruction = 1/ rate of IPS = 1 micro -sec
Execution time of program = number of instructions * time per instruction
= 12 x sec
number of instructions = 12x
CPI= time per instruction / time per cycle= 1/0.2= 5

Effective CPI for computer B=
Cycle time= 1/25 M= 0. 04 micro- sec
Rate of IPS= 18 M I/s
Time per instruction = 1/ rate of IPS = 0.056 micro -sec
Execution time of program = number of instructions * time per instruction
= x sec
number of instructions= x/ 0.056 =18x
CPI= 0.056 / 0.04 = 1.38

11- Four programs are executed on three computers with the following results, The table shows the execution time in seconds, with 100,000,000 instructions executed in each of the four programs. Calculate the MIPS values for each computer for each program.

	Computer A	Computer B	Computer C
Program 1	1	10	20
Program 2	1000	100	20
Program 3	500	1000	50
Program 4	100	800	100

MIPS	Computer A	Computer B	Computer C
Program 1	100	10	5
Program 2	0.1	1	5
Program 3	0.2	0.1	2
Program 4	1	0.125	1

Computer C take a little av. Time to execute the 4 programs., it is faster.

12- The following table, shows the execution times, in seconds, for five different programs on three machines, Compute the speed metric for each processor. Which computer is the slowest ,

Benchmark	Processor		
	R	M	Z
E	417	244	134
F	83	70	70
H	66	153	135
I	39,449	35,527	66,000
K	772	368	369

Processor M takes the least average time to execute the 5 programs, so it is the fastest,